BULLETIN OF
THE GEORGIA ACADEMY OF SCIENCE

Volume XII April, 1954 Number 2

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PROGRAM NUMBER

THIRTY FIRST ANNUAL MEETING
OF
THE GEORGIA ACADEMY OF SCIENCE
NORTH GEORGIA COLLEGE
DAHLONEGA, GEORGIA

April 23, 24, 1954

Local Arrangements Chairman—Dr. J. D. Anthony
North Georgia College

Georgia Junior Academy of Science Meeting: Oglethorpe University, April 16, 17, 1954.

Annual Science Fair: Faith Hall, Oglethorpe University, April 16, 17, 1954.

BRING THIS PROGRAM WITH YOU TO THE MEETINGS.

Edited by
W. B. Redmond

THE BULLETIN of the GEORGIA ACADEMY OF SCIENCE is published four times each year, in April, June, September and December and is sent without charge to all members of the Academy.

Articles to be published in the BULLETIN should be sent to the Secretary, Box 534, Emory University, Georgia. Reprints of articles will be furnished at cost.

PROGRAM

FRIDAY, APRIL 23, 1954

Morning

8:30-12:00	Registration, Luncheon and Banquet Reservations, Science Building.
9:00-11:30	Section Meetings, Presentation of Papers.
11:30-12:00	Section Business Meetings.
12:30- 1:00	Lunch in College Dining Hall or elsewhere.

Afternoon

1:15- 2:30	Address of the President, F. Homer Bell, General Meeting of the Academy. Auditorium.
2:30- 5:00	Section Meetings, Presentation of Papers.

Evening

6:30	Banquet. College Dining Hall. $1.50 per Plate.
7:30	Principal Address: "The Power of Speech." Dr. Sam L. Clark, Head, Department of Anatomy, Vanderbilt University. College Auditorium.

SATURDAY, APRIL 24, 1954

Morning

Gold Panning Trip sponsored by Earth Science Section. Everyone invited. See Page 13.

SECTION I

BIOLOGY SECTION

FRIDAY, APRIL 23, 1954, 9:00 A.M.

Room 105 Science Building

Chairman, DR. WILBUR H. DUNCAN

Egg Production by the Tapeworm *Hymenolepis diminuta*, in Gonadectomized and Thyroidectomized Golden Hamsters, *Cricetus auratus*

J. FRED LANDT, Emory University (Introduced by A. C. Clement)

Single infections of *Hymenolepis diminuta* were established in normal, gonadectomized, thyroidectomized, and simultaneously gonadectomized and thryroidectomized hamsters. Feces from each animal were collected each 48 hours and the tapeworm eggs from the feces counted.

From these egg counts it is was found that, in hamsters, there is no significent sexual difference in the tapeworm egg output nor no significant decrease from gonadectomized males and females when compared to controls. Also, peak output from thyroidectomized and simultaneously operated males and females is not significantly lower, although there is a significant depression in total egg output from all except gonadectomized hosts and simultaneously operated females.

Lack of significant sexual difference in egg output in hamsters is largely unexplained but may be due to intrinsic physiological causes not present in rats where significant sexual differences were observed. Castration effects, also without marked effect on egg output, may be compensated by the greater concentration of bile salts, again not present in gall bladderless rats.

A significantly lowered egg output from all thyroidectomized animals and simultaneously operated males may be attributed to a generally lowered metabolic rate and perhaps a depressed metabolism and diet of the parasite.

Tapeworms may utilize bile, when sex hormones are absent; metabolism of the host may have a direct effect on the welfare of the tapeworm; and, disruption of interaction between the thyroid and gonads of the host, without apparent effect in female hosts, significantly lowers egg output from male hosts.

15 Minutes. **3¼ x 4 slides.**

The Replacement of Chestnut in the Mixed Mesophytic Forest Region

DONALD CAPLENOR, Georgia Teachers College

A few papers have appeared dealing with the replacement of blight-killed chestnut in the oak-chestnut forest region, but apparently none have appeared concerning replacement of chestnut in the mixed mesophytic forest region. Data collected by the author

in the Cumberland Plateau Region of Tennessee in the summer of 1953 comparing the present composition of a stand with its original composition (as determined by the examination of stumps), indicate that a stand which was originally 80 per cent chestnut in the overstory is now a mixed mesophytic stand. Indications from reproduction in the lower layers are that the stand is tending to stabilize as a mixed mesophytic community.

10 Minutes. 3¼ x 4 slides.

Some Anatomical Responses of Cotton to Zinc Deficiency

WILLIAM M. CARLTON, Department of Botany, University of Georgia

Four groups of cotton plants (*Gossypium hirsutum* L.) were grown for one month in sterile sand cultures with a balanced mineral nutrient solution by the drip-culture method. Three of the groups received zinc at the rate of 0.05, 0.005, and 0.0005 p.p.m. respectively, while the fourth group received no zinc at all. Roots, root-tips, several parts of the stem, and leaves from each group of plants were killed, dehydrated, embedded in paraffin, and made into slides for study, the purpose being to determine possible histological and anatomical changes induced in the plants by the deficiency and the absence of zinc from the nutrient supply.

The apical meristems of stem tips and root tips showed decreased activity and area as the zinc level was decreased. Cambial activity decreased in both the older roots and the stems as the zinc level decreased, resulting in much smaller size in the zinc-deficient plants. Adequate zinc appears to promote cell division and the maintenance of a plastic condition in the cortex and pericycle, while low zinc or the absence of zinc tends to promote a precocious maturation of tissues.

15 Minutes. 2 x 2 slides.

Species Differences in Auxin and Tryptophane Content and Growth in *Gossypium* (L.) due to Nutrient Zinc

JOSEPH B. HARRIS, The University of Georgia
(Introduced by WILLIAM H. DUNCAN)

Two American species of cotton initially showed a much slower rate of growth than did two asiatic species observed during a twenty-six day growth period. The rate of growth or dry weight increment was directly proportioned to the auxin content and inversely related to an apparent fraction of the tryptophane content.

The detectable auxin and tryptophane amounts were significantly less in leaf and stem tissue of plants which lacked zinc in the nutrient solution. In root tissue the concentration of auxin was greater in zinc-deficient plants than control plants, however, this could be correlated with a greater concentration of tryptophane in the latter and lesser concentration in the former. This indicated an inability of this zinc-deficient tissue to convert tryptophane to auxin. From

other data it could be seen that some tissues could not synthesize tryptophane without nutrient zinc.

American species were the first to show visible symptoms of zinc deficiency, yet, their total growth was not as seriously affected as was that of the Asiatic species.

Tryptophone determinations were made colorimetrically using Graham's modification of Bates' method. Auxin determinations were made by the straight-growth Avena method of Bentley.

10 Minutes. 3¼ x 4 slides.

Common Butterflies of Georgia

JAMES O. HARRISON, The University of Georgia
(Introduced by Wilbur H. Duncan)

In 1951 Mr. E. P. Boland and I made a number of collections of butterflies from various sections of the state. These specimens and those in the entomological collections of the University of Georgia were studied to determine the distribution and abundance of various species. The present author has continued this work. In addition a number of kodachromes have been taken and additional information assembled. Certain species appear to be limited normally to specific areas or localized situations. For example, *Argynnis cybele* (Fab.) (The Great Spangled Fritillary) seems to be confined to the mountains, while *Zerene caesonia* (Stoll) (The Southern Dog-Face), although state wide in distribution, is abundant only in the Coastal Plain. In an area like the Piedmont certain species, for example *Junonia coenia* Hubner (The Buckeye), frequent open areas such as cultivated and abandoned fields. Other species such as *Euptychia cuyta* (Fab.) (The little Wood-satyr) seem never to leave the woods. A number of species are distributed generally.

Information has also been assembled concerning the plant host of the larval stage. Larvae of any given species usually confine their food source to a small number of plant species, frequently to a given family or occasionally to a given genus.

20 Minutes.

A Study of the Identity of Experimental Plant Material in the Plant Physiology Journal

WILLIAM P. ADAMS, The University of Georgia
(Introduced by WILBUR H. DUNCAN)

A study of Plant Physiology literature for the years 1942-1943 and 1952-1953 revealed several rather interesting and valuable facts. Data from 192 articles indicate inconsistency and negligence in respect to reporting identity of experimental plant materials. Many plant physiologists apparently have the unscientific habit of using only common names of plants in their published work. The great value of proper documentation of research plants by herbarium specimens does not seem to be realized by these workers since none of the papers studied made mention of preservation

of 'voucher' specimens. Over 80 per cent of these articles did not mention the source of plants used in experiments. These practices are followed in spite of the indication by taxonomic and other studies that great genetic variability exists in many taxa indicated as being used as experimental plant material. It seeems obvious from the present study that a majority of plant physiologists is negligent in use of taxonomic nomenclature in reporting results of their research work.

10 Minutes. 2 x 2 slides.

The Sanitary Quality of Ice As Dispensed in Eating Establishments

H. A. WYCKOFF and H. C. COURSON, Georgia Institute of Technology

The objective of this study was to determine the sanitary quality of chipped ice as dispensed in eating and drinking establishments in the Atlanta area. Public Health regulations, pertinent to the subject, are very general and indefinite in nature.

Eighty five samples, from sixty establishments were examined for evidence of contamination as indicated by the presence of coliform organisms and Streptococcus faecalis. A summary of the findings is given.

Results of the study indicate that approximately fifty percent of such ice is of poor sanitary quality.

15 Minutes.

What Is Horticulture and What Does Horticultural Research Include

F. E. JOHNSTONE, JR., Division of Horticulture, University of Georgia

Horticulture has been variously defined and there is apparently some confusion in the minds of persons in other fields of endeavor as to just what horticulture is and what kinds of research horticulturists engage in. This paper is an attempt to clarify both of these questions.

Although it is impossible to formulate a hard and fast definition which will include all the crops and activities usually assigned to horticulture; the following definition may help. Horticulture is a broad field of endeavor concerned with the culture, harvesting, handling, storage, and marketing of food crops which are most highly perishable unless preserved by special techniques, and of flowers and other ornamentals. The science of horticulture is a management science in that it utilizes facts and principles obtained from a number of other sciences such as genetics, entomology, soils, etc., to determine certain interlocking facts and overall principles peculiar to horticulture.

Horticultural research may be divided into three categories.

They are: (1) Service or testing, (2) Research investigations with a definite practical objective in view, and (3) fundamental or basic research which has as its objective the establishment of facts the practical objective of which may not be immediately apparent. Each of these kinds of research are discussed and examples given.

20 Minutes.

11:30 BUSINESS MEETING, ELECTION OF OFFICERS.

BIOLOGY SECTION

2:30 P.M.

Chairman, DR. A. C. CLEMENT

Occurrence and Distribution in Georgia of Plants Toxic to Animals

WILBUR H. DUNCAN, University of Georgia

A bulletin, "Poisonous Plants of Georgia" by W. H. Duncan and T. J. Jones was published in 1949, the data being based on library and field studies made by the authors. These studies have been continued by the senior author. Extensive feeding tests of numerous vascular plants on laboratory animals, chicks and mice, have been made since 1952 with the cooperation of Paul Piercy of the School of Veterinary Medicine. Several plant species not previously demonstrated to be poisonous are shown by this study to be toxic to the experimental animals. These include *Ampelothamnus phillyreifolius*, *Astragalus michauxii*, *Baccharis glomeruliflora*, *B. halimifolia*, *Delphinium carolinianum*, *Gelsemium rankinii*, *Hymenocallis occidentalis*, *Lophiola aurea*, and *Nolina georgiana*. Other plant species suspected to be poisonous gave negative results. Notable examples are several species of *Baptisia* and *Crotalaria*, *Lachanthes tinctoria*, and *Lupinus perennis*.

Abundant distribution data have been accumulated for the above and other species and are summarized on dot maps.

15 Minutes. 2x2 Slides and Balopticon.

Biological Aspects of the Deer Herd Growth in the Georgia Mountains

JAMES H. JENKINS, University of Georgia
(Introduced by EUGENE P. ODUM)

Deer were extirpated in 1895 in the mountains prior to extensive logging apparently as a result of hunting with packs of hounds. Deer were reintroduced in 1928 and have increased fairly satisfactorily. The first shooting was allowed in 1940. The deer kill

has continued to rise steadily through 1953. Much of the pattern of events that occurred on the Pisgah in North Carolina is being repeated but the disastrous deer die-off that occurred in the Pisgah in 1938 can be avoided here. Population and browse surveys now being undertaken point the way toward the best management and utilization, but the future status of the herd will depend largely upon public education and the forest cutting practices.

15 Minutes. 2 x 2 slides.

Azaleas on Gregory Bald, Smoky Mt. National Park (Illustrated)

FRED C. GALLE, Ida Cason Gardens, Chipley
(Introduced by WILBUR H. DUNCAN)

Under the guidance and assistance of staff members of the University of Tennessee Botany Department, an azalea study is being made of plants on Gregory Bald. Kodachrome slides show the colorful display of plants and relate the complexity of the problem. The population shows considerable variability and gene exchange.

A cytological study was started in 1950, 20 counts made in 1951 showed a chromosome number of 2N = 26. These have been discontinued for the present.

Herbarium specimens have been collected (random sample), from the plants while in flower. This material will be reported at a later date.

A long range plan also includes an attempt to partially duplicate in the laboratory, by hybridizing several species, the possible phenomena occurring naturally.

20 Minutes. 2 x 2 slides.

Mitsos and Meiosis in Gingko Biloba

FRANCES P. SCHULTER, Department of Biology, Emory University
(Introduced by W. B. Baker)

A complete study of the chromosomes of *Ginkgo biloba* during mitosis and meiosis has been considered desirable as this monoecious plant is a monotypic genus of such great age. This study is being made with the idea in mind of investigating, in general the nucleic acid distribution and in particular any abnormalities or any peculiar constancies in the behaviour of the chromosomes.

Preliminary examination has verified the chromosome number of Gingko as reported by Sax and Sax (1933) and the following interesting types of behaviour have been indicated: (1) one of the synapsed pairs of chromosomes lags in assuming its position on the spindle during early Metaphase I, (2) a tendency for one chromosome to proceed precociously toward the poles during Anaphase I, (3) heteropycnosis in one pair of chromosomes, (4) an apparent bridge formation during both Anaphase I and II and (5) a large and variable number of nucleoli appear in cells which show no other evidence of polyploidy.

15 Minutes. 3¼ x 4 Slides.

Variations in Gall Anatomy Associated with Different Species of Hosts

EDWIN G. BECK, University of Georgia
(Introduced by Wilbur H. Duncan)

The larvae of the fly *Eurosta solidaginis* induce spherical galls on the stems of at least twenty different species of *Solidago* plants. The gall is composed primarily of parenchyma cells which are produced by division of the pith cells surrounding the larvae and division within anastomosing meristematic strands which are directed centripetally from various points along the vascular bundles of the stem. Galls of this type which develop on stems of *Solidago juncea* and *S. rugosa* do not form these resin ducts or do so to a limited degree only. These galls are usually smaller than others and tend to elongate and form elliptical or spindle-shaped galls as they mature.

12 Minutes. 3¼x4 Slides.

Autolysis of Various Strains of Acid-fast Bacteria Including *Mycobacterium Tuberculosis*

W. B. REDMOND, Veterans Administration Hospital, Atlanta

Autolysis in bacteria may occur primarily to restore to the culture medium some part of the depleted metabolic compounds, but other factors are at least involved.

Tests on a number of strains and species of acid-fast bacteria have revealed that some undergo autolysis and under the same conditions others do not. Some characteristics of the lytic process will be presented. Attempts will be made to correlate the extent and rate of autolysis with other factors, and particularly with pathogenesis.

20 Minutes. 3¼ x 4 slides.

The Effect of Various Temperatures on Autolytic Enzymes of *Mycobacterium Tuberculosis*

B. U. BOWMAN and W. B. REDMOND, Veterans Administration Hospital, Atlanta, Georgia

Mycobacterium tuberculosis when grown at 37° in a medium deficient in nitrogen undergoes autolysis after about 2 weeks growth due to the formation of certain lytic enzymes. Various temperatures were tested to determine the effect on formation and action of the lytic enzymes and on growth.

It was found that 56° C for 30 minutes stopped growth. When lysis had been proceeding for 2 or 3 days cultures placed at 56° for an hour continued to lyse. The lytic action was reduced following exposure at 60° C for 30 minutes. Growth was stopped when the cultures were refrigerated at 4° C. No lysis took place at this temperature. Lysis was slowed but not stopped at 25° C.

20 Minutes. 3¼x4 Slides.

"Histological Technique"—A Kodachrome Moving Picture

JAMES A. MILLER, Department of Anatomy, Emory University

There is not sufficient time in most histology courses to permit students to prepare their own slides. Since an understanding of the effects of histological procedures is essential to the interpretation of pictures seen through the microscope, a Kodachrome moving picture was made to illustrate the commonly employed methods of preparing tissues for microscopic study.

The film illustrates first, the complete paraffin technique including the removal of a block of liver tissue from the living animal, fixation, dehydration, clearing, infiltration, imbedding, sectioning, spreading, staining and mounting. Next a machine (the Autotechnicon) for the mass preparation of tissues is shown in action. After a brief discussion of the celloidin technique, sectioning celloidin blocks on a sliding microtome is illustrated. Then the use of the freezing microtome is shown.

The next scenes deal with the effects of plane of section on the appearance of familiar objects. Oranges are cut transversely, vertically and obliquely. Macaroni imbedded in red jello is cut in various planes to illustrate the effects of angle of section upon the appearance of blood vessels. Finally, a model is dissected to show the effects of sectioning upon the appearance of simple columnar epithelium.

20 Minutes.

Evergreen Hollies

FRED C. GALLE, Ida Cason Gardens, Chipley

The hollies are one of the best groups of broad leaf evergreens for among the many species and varieties, types can be found to fit practically every landscape need.

The American holly and its many variations are under extensive study in the north east. In the south we need not only select American holly varieties but also to include the many other nature hollies and introduced species and varieties that are adapted to this area.

Kodachrome and leaf pattern slides will show the variation found in 15 species of *Ilex*. Additional color slides of *Ilex* will also be shown.

20 Minutes. 2x2 Slides.

SECTION II

CHEMISTRY SECTION

FRIDAY, APRIL 23, 1954, 2:30 P.M.

Room 206, Science Building

Chairman, DR. E. EARL ROYALS

Gadgeteering—A Means of Stimulating High School Pupils in Science

COLONEL J. EDGAR MORRIS, Atlanta

Science and engineering have profoundly influenced our present day standard of living. The average housewife in the United States, today, uses more mechanical and electrical appliances than were dreamed of by her grandmother. Our high school pupils are acquainted with many of these appliances in varying degrees of familiarity. To me this suggests an easy way to start with the known and proceed to the unknown in our science classes.

In our ninth grade general science classes at Brown High School in Atlanta, Ga., we have tried this method with encouraging results. I recall two dainty fourteen year old girls who were the last ones in the class to decide what appliance they would study first. I noticed an old vacuum cleaner in a corner and asked if they had ever used one. Then I asked if they would like to learn a little about how it worked. When they had taken it apart they were fascinated with the windings in the electric motor. They proceeded next to build a simple electric motor from nails, annunciator wire and metal strips cut from a coffee can. When they were ready to go on to another project they achieved perfect scores on a test in electricity and magnetism prepared for a high school physics class.

How will these students do in college? For this I'd like to refer interested persons to reports from our recent graduates who are now doing outstanding work at such institutions as Yale, Lehigh, Emory, Georgia Tech, and others.

10 Minutes.

New Schemes for Qualitative Analysis

WILLIAM RUSSELL, Bluefield, West Virginia

New possible schemes of qualitative chemical analysis of the cations and anions are proposed. HCl preciptates $PbCl_2$, TlCl, HgCl, and AgCl in group 1. After neutralizing with NH_4OH, dilute acetic acid is added and ammonium phosphate used in group 2 to precipitate phosphates of lead, tin, antimony, iron, aluminum, chromium and bismuth. In group 3 ammonium phosphate is suggested for use in alkaline solution to precipitate Mn++, Ba++, Sr++, Ca++, Mg++, as phosphates. Ammonium sulfide then separates CuS, HgS, NiS, CdS, ZnS in group 4, and the resulting fil-

trate is boiled to dryness, heated to expel NH_4Cl and tested for sodium, potassium and lithium.

Another plan uses H_2SO_4 and alcohol in group 2 to precipitate $BaSO_4$, $SrSO_4$, $CaSO_4$ and $PbSO_4$, but tin and antimony may precipitate too. Further separation is suggested by boiling with strong Na_2CO_3 and NaOH solutions, converting to carbonates and dissolving lead, tin and antimony.

The way is then open to use NH_4OH in group 3, and ammonium sulfide later on to precipitate copper, mercury, cadmium, cobalt, nickel and zinc from ammonia complexes.

For anions, boiling with acetic acid released volatile CO_2 and SO_2. Then boiling with Na_2CO_3 will remove most metallic ions. A strong acid reagent such as HNO_3 will precipitate H_2WO_4 and H_2SiO_3. Use of $Mg(NO_3)_2$ will ease the burden on use of $Ba(NO_3)_2$ and $Ca(NO_3)_2$ as later reagents. Cadmium or lead nitrate precipitates ferro and ferri-cyanides, and finally $AgNO_3$ in HNO_3 is added.

20 Minutes.

The Action of Aromatic Sulfonyl Chlorides on Phthalohydroxamic Acid

CHARLES M. BUESS, University of Georgia

The Lossen rearrangement of phthalohydroxamic acid (I) has been found previously to result in the formation of heterocyclic derivatives (J. Org. Chem., in press). Thus, the benzoyl derivative of I yielded 3-benzoxy-1H-quinazolinedione.

In an extension of this study, attempts were made to prepare the *bis*-benzenesulfonyl derivative of I. It was found, however, that salts of I do not react with benzene- (or *p*-toluene-) sulfonyl chloride in a straightforward manner, but a rearrangement occurs as shown below (Ar = C_6H_5- and *p*-$CH_3C_6H_4$-):

$$C_6H_4(CONHONa)_2 + 2\ ArSO_2Cl \longrightarrow \underbrace{C_6H_4NHCON(OSO_2Ar)CO} + 2\ NaCl + ArSO_3H$$

The correctness of this equation was ascertained by: (1) elemental analysis of the heterocyclic derivative, (2) hydrolysis of the heterocyclic to the known 3-hydroxy-1H-quinazolinedione and (3) isolation of the aromatic sulfonic acids as their S-benzylthiuronium salts. Yields are improved by the incorporation of tertiary amines in the reaction mixture.

20 Minutes. 3¼x4 Slides.

The Logic of Lavoisier

T. H. WHITEHEAD, University of Georgia

The first significant textbook in chemistry was that of Lavoisier in 1789. Its English translation by Robert Kerr had profound effect on the teaching, philosophy, and research techniques in England and this country. The Fourth English Edition was printed in Philadelphia in 1799. (Copy will be shown.)

Lavoisier explained in great detail the logic he used in the ar-

rangement of this text and his personal philosophy about the teaching of chemistry. This is surprisingly sound today even though it is not accepted by Colleges of Education.

It is astonishing how the arrangement of material in elementary texts have followed the pattern of Lavoisier but entirely ignored his logic. If we accept the logic and philosophy of Lavoisier, then the arrangement of material today must be greatly different from that used by Lavoisier because our knowledge of chemistry is very different today. In 1789, the only field in which there were sound quantitative data was that of the gaseous state. The solid state was least investigated.

An attempt will be made to outline an order of presenting chemistry in an elementary course using the logic of Lavoisier.

20 Minutes.

Semi-Chemical Pulping of Southern Woods

REAVIS C. SPROULL and R. H. STEVENS, Savannah

This will be a semi-technical paper, concerned with review and analysis of information on semi-chemical pulping of Southern woods. The historical development of the semi-chemical process will be covered briefly and its economic significance to the area discussed.

18 Minutes. 3¼ x 4 slides.

Silica Sols and Gels in Science

F. HOMER BELL, Atlanta

A discussion of some of the newer uses of silicate of soda in the form of gels and sols.

20 Minutes. 3¼ x 4 slides.

BUSINESS MEETING, ELECTION OF OFFICORS.

SECTION III

EARTH SCIENCE SECTION

Friday, April 23, 1954, 9:00 A.M.

Room 305 Science Building

Chairman, PROF. LEWIS LIPPS

Notice

The Earth Science Section will conduct a gold panning trip on Saturday afternoon for members of all Sections of the Academy. Gold pans may be purchased at Robert Moore's Store at Dahlonega; also, a new, thin frying pan will serve very well. Notice of *TIME* and *PLACE* will be posted.

Depositional Features of the Second Laminated Limestone of Northwest Georgia

SIGMUND J. ROSENFELD, Emory University, Georgia

The second "Tiger Stripe" limestone of the Ordovician of northwest Georgia consists of alternating laminae of yellow silt and bluish-gray limestone. A polished section study of this limestone reveals conglomerates, breccias, faults, and geopetal cavities on a megoscopic and microscopic scale. Insoluble residues indicate an increase in silt towards the top of the limestone.

Hypotheses are offered to explain the origin of the laminae and the depositional environment.

10 Minutes. 3¼ x 4 slides.

The Origin of the Green Chert Underlying the Lower Bentonite Bed in the Ordovician System of Northwest Georgia

STEVE WINDHAM, Emory University

Field and laboratory studies of the green chert were made from various outcrops in northwest Georgia. Thin sections, polished sections, and etched sections, proved to be the most valuable sources of information.

From the evidence collected in this investigation, the writer proposes a secondary origin of the chert. A possible source of the silica is also postulated.

10 Minutes. Slides.

Penecontemporaneous Deformation in the Red Mountain Formation

GEORGE W. LAMB, Emory University, Georgia

The Red Mountain formation, especially near Ringgold, Georgia, contains a number of structures formed while the sediments were in an unconsolidated state.

Characteristics and features of these structures will be discussed with the aid of sedimentary analyses of the beds involved. Speculations as to possible origin are made.

10 Minutes. 3¼ x 4 slides.

An Investigation of the Relationship Between the Armuchee Chert and the Frog Mountain Sandstone of Devonian Age

A Joint Project; Read by SIGMUND J. ROSENFELD, Emory University, Georgia

An investigation of the relationship between the Armuchee chert and associated sandstone of northwest Georgia and the Frog Mountain sandstone of northeast Alabama indicates that the upper part

of the Frog Mountain sandstone is a correlative of the Armuchee chert and associated sandstone.

The bedded Armuchee chert appears to be formed by the replacement of a calcareous sandstone. In the sandstone above the Armuchee chert, lenses and stringers of chert replace the calcareous phases. The Chattanooga shale above the Armuchee chert and associated sandstone appears to have a recondite relationship in the formation of the chert.

Several fossil species of Onondaga age from the sandstone associated with the Armuchee chert in northwest Georgia, are similar to species identified by Butts from the Frog Mountain sandstone of Alabama.

10 Minutes. 3¼ x 4 slides.

Occurrence, Possible Origin, and Geological Significance of the Phosphatic Concretions in the Maury Member of the Chattanooga Shale

GARLAND WHEELER, Emory University

Phosphatic concretions are common in the Maury member of the Chattanooga shale, which is of questionable Devonian age. Field and laboratory studies were made of the concretions, the enclosing rock, and of similar concretions in the underlying black shale.

The concretions are interpreted as syngenetic deposits in relatively shallow water and imply geological and chemical environments that are duplicated in present day seas.

15 Minutes. 3¼ x 4 slides.

Chert Horizons in the Mississippian Limestones of Lookout Mountain

WILLIAM H. MOORE, Emory University, Georgia

An investigation of the Mississippian limestones of Lookout Mountain reveals two types of chert, i.e. tabular or lenticular, and nodular. Thin sections and polished sections show interesting structures in the chert and point to a secondary origin.

10 Minutes. 2 r 2 slides.

10:30-11:00 A.M. BUSINESS MEETING

Areal Investigations of Streamflow Resources

M. T. THOMSON, U. S. Geological Survey, Atlanta

Areal investigation of streamflow resources involve more than the mere collection of gaging station records. The application of gaging station records to other streams and other sites requires additional streamflow information inherent to the physiographic

nature of the area. This paper presents some of the problems of areal investigations and the general approach to their solution in Georgia.

10 Minutes. 3¼ x 4 slides.

Areal Investigations of the Low-Flow Regime of Streams

R. F. CARTER, U. S. Geological Survey, Atlanta

Most of the present applications of streamflow information for municipal and industrial water supply and disposal problems involve the minimum flow of small streams. This paper presents methods of applying low-water records from gaging stations to other sites within an area and describes methods of collecting essential areal information for that purpose.

10 Minutes. 3¼ x 4 slides.

Areal Investigations of the High-Water Regime of Streams

M. A. LOPEZ, U. S. Geological Survey, Atlanta

The collection of flood information on small streams presents difficult problems. Some of the information for the larger rivers may be applied to smaller streams on the basis of their relative channel geometry. This paper describes methods of studying channel geometry of small streams in the Yellow River Basin of the Georgia Piedmont.

10 Minutes. 3¼ x 4 slides.

12:00-1:00 LUNCH

1:00-2:30 ACADEMY BUSINESS MEETING

EARTH SCIENCE SECTION

2:30 P. M.

Chairman: Prof. Lewis Lipps

The Eatonton Effigy Eagle Mounds and Related Structures in Putnam County, Georgia

A. R. KELLY, University of Georgia

The history of archaeological investigations relating to the stone effigy mounds and related remains in Putnam county is reviewed, with particular reference to the first descriptions by the Georgia antiquarian, Charles C. Jones, in 1877. More recent archaeological survey by A. R. Kelly, University of Georgia, has uncovered collections of materials from surface sites located within a fifteen mile locus of the two main effigy stone structures. Analysis of these collections, mostly stone artifacts and pottery, indicate

that the general area in which the effigy mounds are located, has been occupied by different prehistoric cultural groups, ranging from an oldest occupation of prepottery, Archaic culture some 5000 years ago, to a proto-historic settling of the region by the probable ancestors of the early Muskogean or Hitchita group, related to the Creeks of middle Georgia, about the time of De Soto.

The stone effigy mounds near Eatonton are unique in being the only stone effigy structures of their size and complexity in North America, although there are widespread examples of earthen structures in varied effigy form, located in the upper Mississippi drainage basin. These effigy mounds of the upper Mississippi have been related by midwestern archaeologists to the prehistoric Hopewell Mound culture, dated by Carbon 14 to circa 2300-900 years before the present. The Effigy Mounds National Monument in Iowa contains numerous effigies, bears, serpents, turtles, birds, as well as linear and simple mound ovals. Other related structures are stone circles and "fortifications," all of earthen construction, which bear a general resemblance to stone fortifications at Fort Mountain (near Chatsworth, Ga.), Ladd Mountain, and on Brown's Mount, near Macon, Georgia.

Alternative hypotheses to account for the generalized cultural resemblance of the Putnam county effigy mounds to these far north occurrences are stated. Scattered archaeological survey results in north and northeast Georgia in recent "river basin" surveys are brought to bear on the problem.

20 Minutes. Slides.

Staurolite in Fannin County, Georgia

VERNON J. HURST, Johns Hopkins University

Staurolitic schists occur at one, and possibly two, horizons in the metasedimentary column of Fannin County, Georgia. One horizon is at the top of the Great Smoky formation, the other, if there are two, is within the Great Smoky formation.

The staurolitic schists are interbedded with biotite-sericite shists, quartzites, and fine quartz conglomerates. The staurolite crystals lie at all angles to the foliation. They are dark brown to black, up to 2″ long, and sometimes completely altered to sericite. The associated minerals are porphyroblastic biotite and almandite; the rock matrix is fine-grained 2M muscovite and quartz. Green tourmaline is an abundant accessory.

A study of staurolite twinning is being carried out on a collection of 1804 crystals from Blue Ridge, Georgia, supplied by the Georgia Geological Survey, and a collection of about 350 select specimens, also from Fannin County, supplied by Mr. Gilbert Withers of Atlanta.

Staurolite twins by reticular pseudo-merohedry. The multiple cell obtained from multiplying the lattice parameters, a,b,c, by 2,1,3, respectively, has seven elements of pseudo-symmetry which, because they are not symmetry elements of the simple cell, may be twin elements. These possible twin elements are:

[001]90° (a 90° rotation about the [001] zone axis)
[100]90°
[010]90°
[213]120°
[203]180°, approx. equal to reflection in (302).
[013]180°, approxi. equal to reflection in (031).
[210]180°, approx. equal to reflection in (120).

Goniametric measurements have shown that the twin laws usually ascribed to staurolite, reflection in (032) and in (232), are erroneous. The true twin laws are to be sought in the possible twin operations listed above. Already it has been demonstrated that the twin operation by which Roman crosses are produced is a 90° rotation about [100]. Calculations are now being made to determine the twin law of the 60° crosses, which are the most common staurolite twins. In an estimated 10,000 crystals which have been examined, not one example has been observed of twinning on (230), reported by Dana in 1876.

15 Minutes. Slides.

The Role of Ionic Diffusion in Granitization

A. T. NAVARRE, Georgia Institute of Technology, Atlanta

A discussion of magmatic solutions and ionic substitution of atoms in the space lattice structure of mineral groups during magmatic and migmatic stages of plutonic evolution.

20 Minutes. Blackboard

Heavy Mineral Analysis of Saprolite From a Selected Area of the Piedmont

WILLIS HOLLAND, JR., Emory University, Georgia

The saprolite under consideration is located in the southeastern part of DeKalb County, the northeastern part of Henry County, and the southwestern part of Rockdale County.

Correlation of the saprolite and underlying rock has been based on the type and percentage composition of the heavy mineral suites.

10 Minutes. 3¼ x 4 slides.

Size Analysis of a Stream Bar in Peachtree Creek

A. M. PETERSON, Emory University, Georgia

Size analysis of samples taken on a grid pattern from this bar indicates longitudinal and lateral sorting.

15 Minutes.

Some Structural Features of Ordovician Redbeds in Northwest Georgia

J. BYRON MOORE, Emory University, Georgia

The area under discusison is in the strike belt of red, calcareous mudrock and interbedded limestones which outcrop in the valley west of Rock Face Mountain.

Clevage-bedding relationships are discussed along with possible structural interpretations.

10 Minutes. 3¼ x 4 slides.

A Geomagnetic Map of Parts of Dawson and Lumpkin Counties, Georgia

CHARLES V. TUCKER, JR. and H. W. STRALEY, III,
Georgia Institute of Technology

Geomagnetic observations have been made at two mile intervals along the major highways of the southwestern part of Lumpkin County and the eastern half of Dawson County, Georgia. Traverses have been run into Forsyth, Gwinnett, Cobb, Fulton, and Bartow Counties. The principal structures are the Helvig anticline, the Nacoochee fault, and possibly a second major fault through Dahlonega and Auraria.

20 Minutes. 2 x 2 slides.

The Colors of Rocks and Soils

M. J. PLICE, State Department of Agriculture, Atlanta

The colors of things, in general, have both practical and esthetic values. Even so, color is mostly taken for granted and very little attention has been devoted to understanding the mechanisms of coloration. Although rocks contain various substances which could cause color, rock colors are usually most strongly influenced by iron. Iron is an extremely versatile pigment which, under varied conditions, can produce almost any color of the rainbow. Since soils are products of rock disintegration their colors are influenced by the color and nature of the rocks from which they are formed. In addition, soil color is made more complex by the presence of organic matter.

Rock colors are usually developed most highly in an arid climate, such as in Bryce and Zion Canyons and on the Colorado Plateau. Although soils are not famed for their colors one of the most important considerations in agricultural soil classification is their color. For example, the soils of the Southeastern States belong to the Red and Yellow soil group. Those of the Northeastern States belong to the Brown and Gray forest soil groups. In the Mid-Western states are found the Dark Prairie and Chestnut-colored soils, while in the arid regions are gray, brown, and red desert soils. Some theories of the mechanism of coloration of rocks and soils are discussed.

The Influence of Lithology and Structure on the Course of the Upper Oconee River

ELDON J. PARIZEK, University of Georgia

The Upper Oconee River is one of the southeast-flowing streams which rise in the Georgia Piedmont. It drains Clarke County and portions of several adjoining counties. Direction of flow of the Upper Oconee was determined by a former sloping upland surface; however, field studies indicate that many meanders now possessed by the river developed subsequent to its entrenchment, through the influence of granite shoals. Angular meander loops and the directions of tributary flow into the Upper Oconee also indicate strong control by structure. In this paper the conditions in the

vicinity of Clarke County are described, and the relations between the areas lithology and structure and the course of the Upper Oconee are demonstrated. It is believed that modifications of Upper Oconee drainage are suggestive of changes that have influenced the courses of other southeast streams of the Georgia Piedmont.

12 Minutes. 2 x 2 slides.

Section IV

PHYSICS, MATHEMATICS and ENGINEERING SECTION

FRIDAY, APRIL 23, 1954, 9:00 A.M.

Room 304 Science Building

Chairman, PROF. E. A. BAILEY

Session of Invited Papers

The Domain of Low Temperatures

W. T. ZEIGLER, Engineering Experiment Station,

Georgia Institute of Technology

A review of the behavior of matter at temperatures down to the lowest so far attained (0.0014° Absolute) including a brief survey of low temperature research now being conducted in this country and abroad.

45 Minutes. 3¼ x 4 slides.

Ultrasonics and Properties of Liquids

D. R. McMILLAN, Department of Physics, Emory University

A discussion of high frequency compressional waves as used in the study of properties of liquids. The small wavelength of these waves allows the use of comparatively small quantities of the liquids being investigated. Such physical properties as temperature variation of velocity, compressibility, and attenuation may be readily determined. The ultrasonic interferometer and circuits for the production and detection of the compressional waves will be presented and discussed.

35 Minutes. 3¼ x 4 slides.

Progress in Radio Astronomy

W. A. CALDER, Agnes Scott College

The most exciting recent development in astronomy is the application of microwave techniques. A study of the literature reveals five aspects which account for the unexpected power of this new tool.

20 Minutes. 2 x 2 slides.

The Nature of Mathematical Research

GERALD B. HUFF, Department of Mathematics,
The University of Georgia

Although there are some seven hundred journals which publish research articles in mathematics and about twelve thousand papers were reviewed in Mathematical Review last year, the "man in the street" has no idea of what a mathematician is doing when he is working at his business. This talk is a description of current trends in mathematical research and its effect on the college curriculum.

40 Minutes.

11:30 BUSINESS MEETING, ELECTION OF OFFICERS.

PHYSICS, MATHEMATICS and ENGINEERING SECTION

2:30 P.M. RESEARCH PAPERS

Chairman, DR. W. A. CALDER

Infinity as a Solution of an Algebraic Equation

E. A. BAILEY, LaGrange College

Mathematicians ordinarily do not consider infinity as a possible root of an algebraic equation. There are, however, circumstances under which it may be useful to assume it as a solution. This is demonstrated by the use of two problems, in each of which the assumption gives a significant result which would otherwise be lost in the particular methods used. It seems that when working with an algebraic equation, if the coefficient of the term with the highest power becomes zero, it would be well to assume that infinity is a solution and see if it gives a significant result. It does not always do so, but sometimes it does.

15 Minutes.

Physics Knowledge and Technique Acquired in High School

ELLIS H. DIXON, SR., Department of Physics,
The University of Georgia

Records of physics students at the University of Georgia indicate either high school physics credit or the lack of it. The two groups, those students with high school credit and those without such credit, are being compared relative to performance in physics at the University of Georgia. Further, the University of Georgia administers a battery of tests to entering freshmen; the predictive power of the results of these tests is also being studied relative to a student's performance in physics.

15 Minutes.

Mathematics in Great Britain

TOMLINSON FORT, Department of Mathematics,
The University of Georgia

The author spent the academic year 1952-1953 in Great Britain during which time he saw a great deal of British mathematicians and of British mathematics. This paper is given to a brief description of the organization of British schools and universties and of mathematical societies in Great Britain. A comparison is presented of British and American methods and organization and comments made on the status of research in both countries.

20 Minutes.

Teaching in the Electronics Laboratory

R. H. ROHRER and J. W. SIMMONS, Departmen of Physics,
Emory University

A brief discussion of techniques and equipment which have been found to be most effective in laboratory instruction in a two-quarter sequence of basic and advanced electronics courses in physics. The use of aids such as snap leads and pre-wired sub-assemblies will be described.

20 Minutes. 2 x 2 slides.

The Proposed High Speed Computer Program at Georgia Tech

B. M. DRUCKER, School of Mathematics, Georgia
Institute of Technology

The paper describes two sequences of courses designed to provide a background for high speed digital computation to be offered by the School of Mathematics; and discusses the proposed computational facilities at the Engineering Experiment Station.

15 Minutes.

The Orbital Stability of Periodic Solutions of Nonlinear Differential Equations with a Small Parameter

JOHN NOHEL, School of Mathematics, Georgia
Institute of Technology

Let x, f be real vectors with 2 components (x_1, x_2) and f_1, f_2) respectively, and suppose u and t real. Consider the system of differential equations

$$x' = Ax + uf(x,u) \qquad (' = d/dt),$$

where A is the matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ and u is a small parameter. The differential equation for the harmonic oscillator is reducible to such a system. A simple sufficient condition, with u sufficiently small, is given for the orbintal stability of the periodic solution, and is then extended to more general systems.

20 Minutes.

Nomographs

DAVID F. BARROW, Department of Mathematics,
The University of Georgia

A nomograph is a graphical device for making approximate calculations. It usually consists of three lines with scale divisions marked upon them. To use it, one lays a straight edge across the three scales, and reads the scale divisions at the intersections. Each type of calculation requires a different nomograph. Not all types of calculation lend themselves to such a graphical device. A nomograph for adjusting student test grades will be used as an illustration.

15 Minutes.

An Electronic Device for Measuring Osmotic Pressures

L. A. NIX, JR. and T. A. BARR, Department of Physics,
The University of Georgia

An electronic pressure measuring device has been constructed using a pressure sensitive condenser as the sensing element. This device is made up of the following components: a variable oscillator containing the pressure sensitive condenser, a fixed frequency oscillator, a pair of radio frequency amplifiers, a mixer circuit, a calibrated audio oscillator, a power supply, and an oscilloscope. The difference in frequency of the two radio frequency oscillators is calibrated in terms of the pressure on the sensitive condenser, and this difference in frequency is measured by th observation of Lissajous figures on the oscilloscope. The Lissajous figures are produced from the above mentioned difference frequency and the output of a calibrated audio oscillator.

A description of the component parts of this apparatus will be given and the advantages and disadvantages of this instrument will be discussed.

15 Minutes. 3¼ x 4 slides.

Section V

PSYCHOLOGY and MEDICINE SECTION

FRIDAY, APRIL 23, 1954, 9:00 A.M.

Room 224 Science Building

Chairman, DR. FLORENE YOUNG

Comparison of the Grassi Block Substitution Test with the Wechsler-Bellevue in the Diagnosis of Organic Brain Damage

FLORENE M. YOUNG, University of Georgia, and JAMES E. PTACEK, Mississippi State Hospital, Whitfield, Mississippi

The relatively new Grassi Block Substitution Test (GBST) and the well-known Wechsler-Bellevue Intelligence Scale (Form I) were administered to 24 subjects known to have organic brain damage,

and to 30 normal persons. The findings from the use of the GBST were compared with those based upon Wechsler's signs for organicity, and Wechsler's Mental Deterioration Index (W-B M.D.I.), in an attempt to ascertain which test is a better index of organic brain impairment.

The GBST was superior to the W-B M.D.I. in identifying cases of "severe mental deterioration" and cases with "no deterioration," the difference being significant at the .05 level. Other comparisons also indicated the greater accuracy of the GBST.

20 Minutes.

A Study of the Insight of College Students Into Their Personality Traits

KATHERINE T. OMWAKE, Agnes Scott College

Insight is the power to see into oneself and to appraise one's own characteristics accurately and realistically, or as Allport put it, insight is the relation of what one thinks he has to what others think he has. An attempt was made to study the degree of insight shown by 84 sophomores taking the first course in psychology. Each student, identified by a number, rated herself on sixteen personality traits, attempting to estimate the decile in which she belonged in comparison with other college students. All students took the Guilford-Zimmerman Temperament Survey, the Maslow S-I Inventory and other personality tests. Each also rated all members of the group on "friendliness" and "adjustment."

Three lines of evidence regarding insight are available from these data. Estimates of the self on various traits are compared with: (1) tests of the traits; (2) mean ratings on the traits assigned to the individual by her classmates; and (3) behavior. More than half of the correlations between the ratings and test scores are significent at the one per cent level of confidence. All th correlations between the self-ratings and the mean ratings assigned by others on the same traits are significant at the one per cent level of confidence, as also are the two correlations between self-rating on a trait and behavior exhibiting that trait. It is concluded that the students show considerable insight into their personality traits.

15 Minutes.

Results of the Psychological Examination of 141 "Mentally Retarded" Children

JOHN A. BROXSON, Atlanta

During the summer of 1953 The Georgia Association for The Help of Retarded Children arranged with The Broxson Psychological Clinic, Atlanta, to make psychological examinations of an estimated 100 infant, preschool and schoolage children. In the end the Clinic did psychololigcal examinations for 141 cases. The basic purpose was to evaluate the degree of educability and trainability as well as any occupational probabilities of these children who had been adjudged, by parents and teachers, to be mentally retarded.

Twelve were infants, 9 to 24 months; twenty-six were preschool children, 2 to 6 years; eighty-four were within the age range of elementary school students; nineteen were within the age range of junior and senior high school students. Intelligence quotients ranged from an estimated 15 to a high of 123. Fifty-six of the 141 were adjudged educable or trainable at least to the extent of economic self-support. Eight percent of the group were mentally competent to complete high school and college. Five percent were clearly college level material, mentally.

15 Minutes.

Section V is fortunate in having obtained as a special speaker Dr. Daniel Billen, Microbial Physiology, University of Tennessee; Lecturer on Radiation Protection. His services have been secured through th kind cooperation of Dr. W. W. Grigorieff, Chairman, University Relations Division, Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee.

The Effect of X-ray Exposure on Cellular Organization and Chemical Constitution of Bacterial Cells

DANIEL BILLEN, Oak Ridge National Laboratory, Oak Ridge, Tennessee

X-ray exposure of *Escherichia coli* induces several profound changes in the macromolecular organization if the cells are subjected to conditions of incubation which allow for an active metabolic state. The nucleic acid containing components are found to break down under these conditions with a concomitant release of nucleic acid fragments into the suspending fluid. This release of material absorbing in the ultraviolet light region is essentialily specific since amino acids or peptides were not found to be lost from the exposed cells. A study of the ability of X-irradiated cells so treated to support phage production revealed that an increasing fraction of such cells lose this ability upon continued incubation. Thus the observed changes in cellular constituents parallels a marked change in the cells synthetic potential.

40 Minutes. Slides.

11:30 BUSINESS MEETING, ELECTION OF OFFICERS.

PSYCHOLOGY and MEDICINE SECTION

2:30 P.M.

Chairman, DR. FLORENE YOUNG

Finger Tremor Waves and Brain Waves

A. S. EDWARDS, University of Georgia

Some account will be given of results of experiments of measurements of involuntary movements by means of several apparatus. Special attention will be given to comparisons of finger tremor

measurements and finger tremor waves with brain waves all recorded with the EEG apparatus. Preliminary experiments suggest that finger tremor waves recorded by the EEG apparatus show differences not shown by brain waves, for example, in the cases of manic-depressive and schizophrenic patients. It is possible that finger tremor waves might make a valuable addition to all EEG examinations.

15 Minutes. Slides.

Further Observation On Orientation Behaviors of New Born Puppies

W. T. JAMES, University of Georgia

Previous reports have given an analysis of the movement and orientation patterns of new born puppies, with emphasis on the behaviors and stimuli involved in nursing and in keeping together. While engaged in these studies a question was raised regarding the effect of gravity on the movement patterns. At what age does the reaction to gravity appear? What angle of inclination elicits the response? How does the response affect the basic orientation patterns? The present report gives an analysis of the method used in studying orientation behavior to an inclined plane and a summary of the results on three litters of puppies.

15 Minutes. 3¼ x 4 slide.

A Critical Evaluate of Two Tests of Aesthetic Judgment

EURI BELLE BOLTON, Georgia State College for Women

Artistic aptitude in the graphic arts has been defined by a number of psychologists as a special ability which includes aesthetic judgment as one of its components. It is considered essential to the artist in creating and in evaluating his own work. It has been suggested in recent years that the development of aesthetic attitudes of appreciation is one of the important objectives of art education.

It is the purpose of this study to make a brief, critical evaluation of two tests of aesthetic judgment. The scores made on these tests by a small sampling of G.S.C.W. students will be compared with those made on two tests of general intelligence. The implications of the results for art courses in general education will be considered.

15 Minutes Reflector-Scope.

A Study of the Relationship Between Chemistry Profile Scores of the Graduate Record Examination and Type of Undergraduate Training

R. TRAVIS OSBORNE and WILMA B. SANDERS, University of Georgia

PROBLEM: To investigate relationships between scores on the Graduate Record Examination chemistry profile test and the kind

and amount of undergraduate training of students with various baccalaureate degrees.

POPULATION AND SUBJECTS: The 1807 graduate students who were in attendance at the University of Georgia between February, 1946, and February, 1952, were selected as subjects for this study. The group included all graduate students except some few irregulars who were not seeking advanced degrees. All seven professional schools and five divisions of the College of Arts and Sciences were represented. In the base group men students out numbred women: 1173 to 634. The mean age of the group was 31.76.

RESULTS: The ten degree groups studied roughly form three clusters or sub-groups made of science, non-science, and education majors. Graduate students who have undergraduate degrees in agriculture, including Agricultural Engineering and Forestry and the straight B.S. students, are significantly better in chemistry than all of the other degree groups. From the evidence available it appears that achievement in chemistry decreases significantly as the number of required courses in chemistry decreases. On the basis of the facts presented above it would seem reasonable to assume that the chemistry profile test of the G.R.E. measures the content of the basic chemistry courses required of University of Georgia undergraduates.

10 Minutes. 3¼ x 4 slides.

Section VI

PHILOSOPHY and HISTORY OF SCIENCE SECTION

FRIDAY, APRIL 23, 1954, 9:00 A.M.

Room 206 Science Building

Chairman, DR. GEORGE C. SEWARD

The Value of Brain Models in the Understanding of Behavior

HUDSON JOST, University of Georgia

The recent work in the field of electronic computers has helped in our understanding of brain function, but has in some other instances, perhaps, clouded the issue of critical function. This paper will be a critical evaluation of some of this work. An attempt to evaluate its contribution to the field of psychology and the science of behavior in general may be of value at this time.

Normality and Mutualism in Biology

ARTHUR L. COHEN, Oglethorpe University

In certain lower organisms, the Acrasieaes and other opsimorphic forms (cf. Cohen Ann. N. Y. Acad. Sci. 56: 938-943. 1953) the vegetative, actively growing state is spent as an ameboid mass, or as separate amebae (Acrasieae). At the end of the active growing state the amebae or other units congregate to form a fruiting structure of more or less complexity, or the ameboid mass (the Myxomycetes) transforms into a definite fruiting structure. This

phenomenon of definite shape occurring after growth has been given the name of opsimorphosis (op. cit.).

In the author's study of the Acrasieae it appears that the concept of normality must be reexamined. The "normal" well-differentiated fruit probably rarely occurs in nature, and normality here is probably tantamount to maximum differentiation under laboratory conditions.

The Acrasieae have also been used as examples of mutualism (in a wide sense of the word) or of colonial behavior because the fruits are formed by the coming together of the separate amebae. It is frequently assumed that congregations of organisms are due to mutual influences. It appears that sometimes external orienting factors play an important role and that gregarious or colonial behavior in general may not in all cases be totally due to stimuli arising within the group.

20 Minutes. 16 mm. silent movie.

Section VII

SCIENCE EDUCATION SECTION

FRIDAY, APRIL 23, 1954, 2:30 P.M.

Room 106 Science Building

Chairman, MRS. HELENE LAMMERS

Symposium on Education in Science

What the College Expects of the High School Student

W. E. McNAIR, Agnes Scott College

What Preparation Industry Expects from High School and College Graduates

DANIEL C. KYKER, General Electric Company, Atlanta

Discussion led by ARTHUR L. COHEN, Oglethorpe University

BUSINESS MEETING, ELECTION OF OFFICERS